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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J527

REV. NOV2000

Issued 1952-01
Revised 2000-11

Superseding J527 FEB1996

Submitted for recognition as an American National Standard

(R) Brazed Double Wall Low-Carbon Steel Tubing

1. ***Scope—***This SAE Standard covers brazed double wall low-carbon steel tubing intended for general automotive, refrigeration, hydraulic, and other similar applications requiring tubing of a suitable quality for bending, flaring, beading, forming, and brazing.

2. ***References***

2.1 **Applicable Publications—**The following publications form a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1677—Tests and Procedures for SAE Low-Carbon Steel and Copper Nickel Tubing

2.1.2 ASTM PUBLICATION—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM A 254—Standard Specification for Copper Brazed Steel Tubing

2.2 **Related Publications—**The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J409—Product Analysis-Permissible Variations from Specified Chemical Analysis of a Heat or Cast of Steel
SAE J512—Automotive Tube Fittings
SAE J513—Refrigeration Tube Fittings-General Specifications
SAE J514—Hydraulic Tube Fittings
SAE J516—Hydraulic Hose Fittings
SAE J533—Flares for Tubing
SAE J1065—Pressure Ratings for Hydraulic Tubing and Fittings
SAE J1290—Automotive Hydraulic Brake System—Metric Tube Connection
SAE J1453—O-Ring Face Seal

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3. ***Manufacture—***The tubing shall be made from a single or double strip of steel shaped into the form of a double-wall tubing, the walls of which are secured and sealed by copper brazing in a controlled atmosphere. The braze shall be uniform with no evidence of a bead on either the inside or outside of the tubing. Typically this type of tubing is available in both coiled and straight condition. Straightness requirements should be agreed upon between supplier and purchaser.

4. ***Dimensions and Tolerances—***The standard nominal diameters and the applicable dimensions and tolerances are shown in Table 1.

TABLE 1—TUBING DIMENSIONS AND TOLERANCES(1)

Dash Size	Nominal Tubing OD mm	Outside Diameter(1) Basic mm	Outside Diameter(1) Tolerance ±mm	Wall Thickness Basic mm	Wall Thickness Tolerance (2)(3)(4) ±mm
–2	3.18	3.18	0.05	0.64	0.13
–3	4.76	4.78	0.08	0.71	0.08
–4	6.35	6.35	0.08	0.71	0.08
–5	7.94	7.92	0.08	0.71	0.08
–6	9.53	9.53	0.08	0.71	0.08
–7	11.11	11.13	0.10	0.76	0.08
–8	12.70	12.70	0.10	0.89	0.09
–9	14.29	14.27	0.10	0.89	0.09
–10	15.88	15.88	0.10	0.89	0.09

1. The actual outside diameter shall be the average of the maximum and minimum outside diameters at any one cross section through the tubing.
2. The tolerances listed represent the maximum permissible deviation at any point.
3. Other sizes may be specified by agreement between the supplier and the user.
4. For intermediate wall thickness, the tolerance for the next heavier wall thickness shall apply.

5. ***Manufacturing Standards***

5.1 **Tubing End Condition—**The tubing will be produced using normal mill cut-off practices. This will include, but is not limited to single-cut ends, double-cut ends, saw-cut ends, and rotary cut ends. Care will be taken to minimize the distortion of the tube ends. Ends that require further processing will be by agreement between the producer and purchaser.

5.2 **Surface Finish—**Surface imperfections such as handling marks, die marks, or shallow pits shall not be considered injurious defects provided such imperfections are not detrimental to the function of the tubing, and these imperfections are within the tolerances specified for diameter and wall thickness. The removal of such surface imperfections is not required. A slight seam lift or separation on the outside bevel edge of the outside wall on double wall tubing is not considered an injurious defect during end forming operations, provided that the seam condition doesn't effect the sealing area of the end form. Sealing surfaces shall be smooth and free from nicks, pit marks, and any other defects that prevent sealing.

6. ***Material—***Tubing shall be made from low carbon steel, such as UNS G10080 or UNS G10100.

7. ***Mechanical Properties*****—**The finished tubing shall have mechanical properties as tabulated in Table 2:

TABLE 2—MECHANICAL PROPERTIES

Properties	Values
Yield Strength, min (0.2% offset)	170 MPa
Tensile Strength, min	290 MPa
Elongation in 50 mm	14% min
Hardness (Rockwell 30 T scale), max	65

8. ***Performance Requirements*****—**The finished tubing shall satisfactorily meet the following performance tests. All tests are to be conducted in accordance with the procedures in SAE J1677 or ASTM A 254 as designated.

8.1 **Bending Test —**SAE J1677 JAN1996 (Section 5.3)

8.2 **Flaring Test —**SAE J1677 JAN1996 (Section 5.5.2)

8.3 **Pressure Proof Test —**SAE J1677 JAN1996 (Section 5.8). Performed by agreement between purchaser and producer, (where allowable unit stress of material(s) = 140 MPa (80% of minimum yield strength).

8.4 **Nondestructive Electronic Test—**SAE J1677 JAN1996 (Section 5.9)

8.5 **Hardness Test—**SAE J1677 JAN1996 (Section 5.6)

8.6 **Flattening Test—**SAE J1677 JAN1996 (Section 5.1)

8.7 **Tensile Test—**SAE J1677 JAN1996 (Section 5.7)

8.8 **Inside Surface Cleanliness—**ASTM A 254 March 1997(Section 8)

9. ***Test Certificates*****—**A certificate of compliance to the performance requirements shall be furnished to the purchaser by the producer if requested in the purchase agreement.

10. ***Corrosion Protection*****—**The inside and outside of the finished tubing shall be protected against corrosion during shipment and normal storage. If a corrosion preventive compound is applied, it shall be such that after normal storage periods it can readily be removed by cleaning agents normally used in manufacturing. Extended corrosion resistance coatings, such as tern coating, galvanizing, epoxy paint, etc., are available and can be supplied at the request of the user.

11. ***Packaging*****—**The tubing is to be packaged in such a way to allow it to be transported and stored with normal care, without being damaged. Any special packaging will be by agreement between the producer and the purchaser.

12. ***Notes***

12.1 **Marginal Indicia—**The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE FLUID CONDUCTORS AND CONNECTORS TECHNICAL COMMITTEE SC5—AUTOMOTIVE AND HYDRAULIC TUBE AND FITTINGS

SAE J527 Revised NOV2000

Rationale—Changes to this document include:

1. Scope

    a. Expanded to better define application of SAE J527.

2.1.2 References—Applicable Publications

    a. Added ASTM A254 document to define how to do Internal Cleanliness Testing which was added to Performance Requirements

2.2 References—Related Publications

    a. Changed the word “is” to are for correct use of grammar.

2.2.1 References—Related Publications

    a. Added SAE J409— Product Analysis-permissible Variations from Specified Chemical Analysis of a Heat or Cast of Steel.

    b. Added SAE J512—Automotive Tube Fittings

    c. Added SAE J513—Refrigeration Tube Fittings-General Specifications

    d. Added SAE J514—Hydraulic Tube Fittings

    e. Added SAE J516—Hydraulic Hose Fittings

    f. Added SAE J1065—Pressure Ratings for Hydarulic Tubing and Fittings

    g. Added SAE J1290—Automotive Hydraulic Brake System—Metric Tube Connection

    h. Added SAE J1453—O-Ring Face Seal

3. Manufacture

    a. Expanded to include notification of product availability as either a coiled or straight product.

    b. Expanded to include need for agreed upon straightness requirements.

4. Dimensions and Tolerances —Table 1

    a. Added footnote #3 to address non-charted product size availability.

    b. Added footnote #4 to address intermediate wall thickness tolerance requirements.

5. Manufacturing Standards

    a. Added this document section to more clearly define the end product requirements.

5.1 Manufacturing Standards—Tubing End Condition

    a. Acceptable tubing cut end condition is defined.